

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

Listing of Claims:

1. (Currently Amended) A video editing device for use with a computer readable recording and playing device operable to allow video material recording and playback and to allow non-linear editing of the video material, comprising:

frame processing means for retrieving a video frame that is a basic construction unit of the video material from said recording and playing device which stores video material to be edited, and for performing frame processing on the retrieved video frame; wherein said frame processing means comprises:

at least one image processing means for performing predetermined image processing on individual video frames;

first storage means interposed between said recording and playing device and said frame processing means; and

second storage means interposed between each of a plurality of said frame processing means;

control means for controlling said frame processing means such that at least two types of frame processing by said frame processing means are performed upon the retrieved video frame in parallel,

wherein controlling is performed by storing, in order of input, a plurality of dependency relationship data, analyzing relationships among the plurality of dependency

relationship data, and determining each type of frame processing to be executed as a function of the relationships among the plurality of dependency data;

frame storage means for storing a plurality of video frames after said frame processing means completes all frame processing frame-by-frame upon the plurality of video frames, and for sequentially outputting the plurality of video frames, wherein said first storage means, said second storage means and said frame storage means are physically different; and

an output module that receives, from an image conversion object, a buffer address indicating where the retrieved video frame is stored and a corresponding time code;

whereby the video frames are output from said frame storage means in real-time.

2. (Previously Presented) The video editing device according to claim 1 wherein

said control means causes frame processing by said frame processing means to be performed in a non-real-time manner.

3. (Previously Presented) The video editing device according to claim 1, wherein said control means

controls said recording and playing device, said first and second storage means, and each of the frame processing means such that at least two types of processing of video frames between

said recording and playing device,

said first storage means,

said second storage means, and

image processing on video frames in each of said image processing means
are performed in parallel, and

further controls said frame storage means such that the plurality of video frames,
stored in said frame storage means in no special order, are output in a predetermined order.

4. (Previously Presented) The video editing device according to claim 1,
further comprising:

input means for inputting an editing schedule along a time axis;

with said control means creating processing management data representing a
dependency relationship between the kind of frame processing performed on each video frame
and each frame processing based on the editing schedule input through said input means, and

controlling said frame processing means operable to be executed based on said
processing management data.

5. (Previously Presented) The video editing device according to claim 4,
wherein said control means

stores a plurality of said created processing management data;

selects executable frame processing from said plurality of stored processing
management data; and

controls said frame processing means in order to execute said selected frame
processing.

6. (Previously Presented) The video editing device according to claim 5,
wherein said control means

defers execution of readout processing when said selected executable frame
processing is processing for reading out a video frame from said recording and playing device,
and

selects a plurality of sequential video frames from video frames to be read out at
the time when a plurality of said deferred-execution read-out processing are gathered and then
reading out the plurality of selected video frames from said recording and playing device for
storage in said first storage means.

7. (Previously Presented) The video editing device according to claim 3,
said image processing means comprising:

a first image processing portion constructed by hardware; and
a second image processing portion constructed by software.

8. (Currently Amended) A video editing method for using a computer
readable recording and playing device to allow video material recording and playback for
performing non-linear editing on the video material, comprising the steps of:

retrieving a video frame that is a basic construction unit of the video material
from said recording and playing device which stores video material to be ~~edited~~ edited and for
performing frame processing on said retrieved video frame;

storing said video frames; ~~that are used~~;

said frame processing step comprises:

at least one image processing step for performing predetermined image processing on individual video frames;

a first writing step for writing video frames to a memory;

a first read-out step for reading out video frames from said memory and providing them to any of image processing steps;

a second writing step for writing video frames processed at said frame processing step and then writing them in said second memory; and

a second read-out step for reading out video frames from said second memory and providing the video frames in any of the image processing steps,

controlling said frame processing such that at least two types of frame processing are performed upon the retrieved video frame in parallel,

wherein controlling is performed by storing, in order of input, a plurality of dependency relationship data, analyzing relationships among the plurality of dependency relationship data, and determining each type of frame processing to be executed as a function of the relationships among the plurality of dependency data;

storing a plurality of video frames after said frame processing means completes all frame processing frame-by-frame upon the plurality of video frames, wherein said memory and said second memory are physically different;

receiving a buffer address indicating where the retrieved video frame is stored and a corresponding time code; and

outputting sequentially said plurality of stored video frames in real-time.

9. (Previously Presented) The video editing method according to claim 8
wherein

frame processing at said frame processing step is performed in a non-real-time
manner.

10. (Previously Presented) The video editing method according to claim 8,
wherein

at least two types of frame processing are performed at said first and second
writing steps, said first and second read-out steps, and said image processing steps are performed
in parallel, and the plurality of the video frames stored at said frame storage step in no special
order are output in a predetermined order at said frame output step.

11. (Previously Presented) The video editing method according to claim 8,
further comprising:

an input step for inputting an editing schedule along a time axis; and
a step for creating processing management data representing a dependency
relationship between the kind of frame processing performed on each video frame and each
frame processing based on the editing schedule input in said input step,

wherein said frame processing step is executed based on said processing
management data.

12. (Previously Presented) The video editing method according to claim 11,
further comprising:

a step for storing a plurality of said created processing management data; and
a step for selecting executable frame processing from said plurality of stored management processing data, wherein said selected frame processing is executed at said frame processing step.

13. (Previously Presented) The video editing method according to claim 12, wherein said frame processing step comprises the steps of:

deferring execution of readout processing when said selected executable frame processing is processing for reading out a video frame from said recording and playing device;

selecting a plurality of sequential video frames from video frames to be read out at the time when a plurality of said deferred-execution read-out processing are gathered; and

reading out the plurality of selected video frames from said recording and playing device.

14. (Previously Presented) The video editing method according to claim 10, wherein

said image processing step comprises performing image processing by using hardware; and

performing image processing by using software.

15. (Currently Amended) A video editing system for performing non-linear editing of video material, comprising:

a computer readable recording and playing device operable to allow video material recording and playback;

frame processing means for retrieving a video frame that is a construction unit of the video material from said recording and playing device, and for performing frame processing on the retrieved video frame wherein said frame processing means comprises:

at least one image processing means for performing predetermined image processing on individual video frames;

first storage means interposed between said recording and playing device and said frame processing means; and

second storage means interposed between each of a plurality of said frame processing means;

control means for controlling said frame processing means such that at least two types of frame processing by said frame processing means are performed upon the retrieved video frame in parallel,

wherein controlling is performed by storing, in order of input, a plurality of dependency relationship data, analyzing relationships among the plurality of dependency relationship data, and determining each type of frame processing to be executed as a function of the relationships among the plurality of dependency data;

frame storage means for storing a plurality of video frames after said frame processing means completes all frame processing frame-by-frame upon the plurality of video frames, and for sequentially outputting the plurality of video frames, wherein said first storage means, said second storage means and said frame storage means are physically different; and

an output module that receives, from an image conversion object, a buffer address indicating where the retrieved video frame is stored and a corresponding time code;

wherein video frames are output from said frame storage means in real-time.

16. (Currently Amended) A video editing method for editing source video data recorded on a computer readable recording medium, comprising the steps of:

playing said source video data in frames and performing frame processing on said played frame video data;

first and second storage means for storing the video frames; ~~which can store video frames are used;~~

said frame processing step comprises:

at least one image processing step for performing predetermined image processing on individual video frames;

a first writing step for reading out video frames from said recording and playing device and then writing them in said first storage means;

a first read-out step for reading out video frames from said first storage means and then providing them to any of image processing steps;

a second writing step for reading out video frames processed at said frame processing step and then writing them in said second storage means; and

a second read-out step for reading out video frames from said second storage means and then providing them in any of the image processing steps,

storing the frame video data on which said frame processing is completely performed and outputting said stored frame video data as output video data, wherein said first storage means and said second storage means are physically different,

receiving a buffer address indicating where the frame video data is stored and a corresponding time code; and

controlling said frame processing such that each frame of said output video data is real-time video data,

wherein controlling is performed by storing, in order of input, a plurality of dependency relationship data, analyzing relationships among the plurality of dependency relationship data, and determining each type of frame processing to be executed as a function of the relationships among the plurality of dependency data;

wherein at least two types of frame processing are performed in parallel on a frame-by-frame basis upon a single played video frame.